IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

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Application No.:	Unassigned	Art Unit:	Unassigned
Filed:	May 29, 2001	Examiner:	Unassigned
For:	SYSTEM FOR MATCHING STEREO IMAGE IN REAL TIME		

CLAIMS PENDING AFTER PRELIMINARY AMENDMENT

1. A real-time stereo image matching system comprising:

signal converting means for converting an image input from a first camera and a second camera into a digital signal; and

image matching means for calculating a matching cost based on a pair of pixels in one scan line of the first and second digital image signals, tracing a decision value which determines a minimum matching cost, and outputting the decision value as an estimated disparity according to predetermined activation information.

2. The real-time stereo image matching system of claim 1, wherein the first camera and second camera have optical axes parallel to each other and have coplanar focal planes on.

3. The real-time stereo image matching system of claim 1, wherein, in the image matching means, the matching cost is calculated after occlusion information for pixels which do not match in the scan line is added to the pair of pixels.

4. The real-time stereo image matching system of claim 1, wherein the image matching means further comprises:

first storage means for storing the digital image pixels from the first camera;

second storage means for storing the digital image pixels from the second camera;

processing means for outputting a estimated disparity using pixels input from the first and second storage means; and

clock control means for providing a clock signal for controlling operations of the first and second storage means and the processing means.

5. The real-time stereo image matching system of claim 4, wherein the system includes N processing means, N/2 first storage means, and N/2 second storage means where N is an integer multiple of 2.

6. The real-time stereo image matching system of claim 5, wherein the processing means exchanges information with neighboring processing means.

7. The real-time stereo image matching system of claim 5, wherein, among the N processing means, only a processing means that outputs the predetermined disparity is activated at one time and the remaining processing means are in high impedance states.

8. The real-time stereo image matching system of claim 4, wherein the first storage means and the second storage means are initialized when the processing means completes processing of pixels in one scan line.

9. The real-time stereo image matching system of claim 4, wherein a pixel stored in the first storage means is delayed by (N/2-1) clock cycles compared to a pixel stored in the second storage means.

10. The real-time stereo image matching system of claim 4, wherein the clock control means outputs a first clock signal for even-numbered processors and the second storage means, and a second clock signal for odd-numbered processors and the first storage means.

11. The real-time stereo image matching system of claim 4, wherein the processing means comprises:

a forward processor for receiving a pixel of one scan line in the first storage means and the second storage means, and outputting a determined matching cost and a decision value;

decision storage means for storing the decision value output from the forward processor; and

a second processor for outputting a determined disparity, using the decision value output from the decision storage means, according to activation information.

12. The real-time stereo image matching system of claim 11, wherein, when a write control signal is input from outside, the first processor operates, and when a read control signal is input from outside, the second processor operates.

13. The real-time stereo image matching system of claim 11, wherein the decision storage means has a last-in first-out structure in which the decision value that is output last from the first processor is first input to the second processor.

14. The real-time stereo image matching system of claim 11, wherein the first processor comprises:

matching cost calculating means for calculating a matching cost, using a pixel of one line in the first storage means and the second storage means;

first adding means for adding the calculated matching cost to the fed-back accumulated cost;

comparing means for comparing the output of the first adding means with the costs of neighboring processing means, and then outputting the minimum matches of cost and decision value;

storage means for storing the minimum cost that is a comparison produced by the comparison means, as the accumulated cost; and

second adding means for adding the entire cost and occlusion cost to produce a sum, and then outputting the sum to neighboring processing means.

15. The real-time stereo image matching system of claim 11, wherein the second processor comprises:

logical OR means for OR-ing activation information of the neighboring processing means and feed-back activation information route;

a register for storing the last activation information produced by the logical OR means;

demultiplexing means for demultiplexing the last activation information according to the decision value output from the decision storage means and outputting to the neighboring processing means and feeding back to the logical OR means; and

a tri-state buffer for outputting the decision value output from the decision storage means, as a determined disparity, according to the activation information of the register.

16. The real-time stereo image matching system of claim 17, wherein the output from the decision storage means controls which direction the demultiplexing means passes the activation information.